

CH-60S FLEET COMBAT SUPPORT HELICOPTER



Navy ACAT IC Program

Total Number of Systems:	237
Total Program Cost (TY\$):	\$4327.5M
Average Unit Cost (TY\$):	\$18.26M
Full-rate production:	1QFY02

Prime Contractor

Sikorsky Aircraft

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The CH-60S Fleet Combat Support Helicopter is the replacement for the current Navy CH-46D. The CH-60S is designed to provide the Navy's Combat Logistics Force with: (1) responsive vertical replenishment; (2) vertical onboard delivery; and (3) airhead support as well as day/night Amphibious Task Force search and rescue (SAR) services. Secondary missions include Special Warfare (overwater) Support (SWS), aeromedical evacuations, and noncombatant evacuation. A configuration of the CH-60S is also being designed to add the following missions: Combat Search and Rescue/Special Warfare (overland) Support (CSAR/SWS), Anti-surface Warfare (ASUW), and aircraft carrier plane guard/SAR. The addition of the Airborne Mine Countermeasures (AMCM) mission was approved on May 21, 2000. The multi-mission CH-60S supports the *Joint Vision 2020* operational concepts of *focused logistics* and *full-dimensional protection*.

The CH-60S is an Army UH-60L Blackhawk airframe incorporating Navy Seahawk marinized GE T-700 engines, folding rotorhead and tail pylon, transmission/drive train, stabilator, and flight controls. The CH-60S will share, in part, with the Navy SH-60R helicopter a "Common Cockpit" which

consists of multi-functional displays, keysets, and a complex client-server based tactical data processing system. The CH-60S avionics will include: (1) dual UHF/VHF transceivers; (2) inertial and Global Positioning System navigation; (3) night vision device-compatible heads-up displays; and (4) a ground proximity warning system. The aircraft will have provisions installed to incorporate a future CSAR mission kit consisting of tactical moving maps, FLIR with a laser range finder/designator, crew-served side suppression weapons, HELLFIRE missiles, forward firing guns/rockets, and an integrated self-defense system. The aircraft will also have provisions installed to incorporate AMCM sensors and destructors, individual programs that are currently in development.

BACKGROUND INFORMATION

The current CH-46D Navy helicopters are over 25 years old and a large fraction of them are nearing or have exceeded their original service life. An OA of the prototype CH-60S helicopter was conducted in response to a congressional mandate to demonstrate the concept of using a modified UH-60L Blackhawk to perform the Fleet Combat Support (HC) mission as a replacement for the aging CH-46D. The CH-60S ORD and TEMP were approved in April and May 1998, respectively.

Combined compliance testing (CT), developmental testing (DT), and operational testing (OT) was conducted from November 1997-January 1998 at Sikorsky's Stratford, CT facility and with the Combat Stores Ship, USS Saturn, 30 miles south of Long Island, NY. Each flight had either a DT or OT co-pilot, and a Sikorsky test pilot during the 45 hours flown. The OT portions of the tests were conducted in accordance with a DOT&E approved test plan as an early OA, and supported a May 1998 LRIP decision for initial production lots of the CH-60S. The assessment found the CH-60S to be potentially operationally effective and potentially operationally suitable for the HC mission. Due to the commonality of predecessor H-60 variants, the assessment was bolstered by historical data from Army and Navy files, where applicable.

The CH-60S has been designated a covered system for Live Fire Test under Section 2366, Title 10 U.S. Code. The finding that full-up live fire testing would be unreasonably expensive and impractical was made by USD(A&T) on July 8, 1998. An alternative LFT&E plan was approved at that time and Congress was notified. The plan is currently being updated to reflect the need for additional testing to accommodate the addition of the AMCM mission systems.

TEST & EVALUATION ACTIVITY

The U.S. Navy made the decision to develop and deploy an organic AMCM sensor system capability. The CH-60S was selected for the AMCM mission, and proof of concept testing commenced in August 1999 with the prototype CH-60S. Phase one testing, consisting of both static and dynamic pull tests, was successfully completed in December 1999. Phase two testing, consisting of dynamic tow testing of a representative shape, was successfully completed in January 2000. Phase two demonstrated single and twin-engine flight qualities, pilot workloads, and mission endurance. Phase three testing—consisting of all aspects of captive carriage, stream, tow, and recovery of the prototype AN/AQS-20 sonar system towed body—was completed in November 2000.

A revision to the ORD was approved on May 21, 2000 to add AMCM as a primary mission. A revision to the TEMP, which includes the AMCM mission, is in preparation and should be approved in 2QFY01.

The first flight of the first LRIP aircraft occurred on January 27, 2000, just days short of the Acquisition Program Baseline (APB) threshold. Late delivery of the aircraft to the Navy was caused by Common Cockpit technical development problems, late delivery of the systems, and immature software. The first flight supported a second LRIP decision, but schedule delays prompted internal program reviews that determined the need for a revised APB. The program was restructured to accommodate an additional 185-flight hours necessitated by the inability of the SH-60R program to conduct the majority of planned Common Cockpit testing. Schedule allowances were also made to provide sufficient time to prepare a final OPEVAL report and accommodate BLRIP report requirements.

TECHEVAL testing for the CH-60S Combat Support missions started in May 2000 and are scheduled to complete in January 2001. Successful TECHEVAL will support an LRIP-III decision. OPEVAL is scheduled to begin in early March and complete by the end of May to support a Milestone III decision in September 2001. The Navy's Helicopter Master Plan calls for the introduction of the AMCM mission configured CH-60S into the Fleet in CY05 and the CSAR mission configured CH-60S in CY06. Detailed development and test schedules are not yet available to support the introduction of these missions.

TEST & EVALUATION ASSESSMENT

The LFT&E strategy for the CH-60S required assessment of its combat survivability and potential for crew casualties, and included a recommendation of whether additional tests would be required. A panel of Navy, Army, and OSD experts convened in March 1999. Relevant Joint Live Fire and combat data for the H-60 series of aircraft were used to assess the survivability of the CH-60S. After the March 1999 meeting, the Naval Air Warfare Center conducted a component by component vulnerability assessment of the CH-60S using Navy mission scenarios. The Navy and DOT&E reviewed the assessment report and concluded that important data voids exist when employing the CH-60S in CSAR missions. DOT&E recognized that the identified data voids were common to other H-60 variants such as the Navy's SH-60R and the Army's UH-60L Upgrade, and proposed that the Army and Navy coordinate their efforts to fill the data voids so that the total LFT&E data requirement can be met at minimum cost. The Navy and the Army are preparing a plan whereby each Service will address some of the data voids and, taken together, all of the data voids will be addressed.

Both CT and DT testing to date have not demonstrated the maturity and stability levels expected of the initial versions of the Airborne Operations Program (AOP) software. The software integrates all flight controls, propulsion, navigation, and communications systems with the Common Cockpit flat-panel displays and keyset controls for the pilots. Future versions of AOP will integrate the weapons and self-defense systems required for the CSAR mission, as well as the five AMCM detection sensors and destructors. Although the AMCM systems are each ACAT II programs with their own individual ORD and TEMP, DOT&E intends to exercise operational test oversight of the integrated AMCM/CH-60S mission as an element of the CH-60S program. Two of the AMCM programs, Rapid Airborne Mine Clearance System and Airborne Mine Neutralization System, qualify as LFT&E covered systems for lethality and will be added to the master T&E oversight list during the next annual update.

RECOMMENDATIONS, CONCLUSIONS AND LESSONS LEARNED

Development and test of the Common Cockpit system has been a greater technical challenge than originally anticipated. Initial plans to test the bulk of the system during the first of two SH-60R DT and

OA periods adversely impacted the CH-60S test schedule due to SH-60R schedule uncertainty. Restructure of both programs transferred 185 additional flight test hours to the CH-60S program to enable sufficient TECHEVAL and OPEVAL on the Common Cockpit system in the CH-60S aircraft. Although additional flight test hours were provided, the unanticipated low level of flight software maturity continues to impose schedule risk on the overall CH-60S program.

The Navy and Army have not yet established a firm, fully funded, cooperative plan to conduct LFT&E to address OSD-identified data voids for the family of H-60 aircraft. Establishment of such a plan is necessary to control total cost and minimize the number of test articles subjected to destructive test.